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Food Insecurity among International Students: A Scoping Review Protocol

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Food Insecurity among International Students: A Scoping Review Protocol

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Abstract

Introduction: Canada is a significant destination for international students due to its reputation for quality education. The allure of the prospects of applying for a postgraduate work permit and eventually becoming a permanent resident also attracts many people to consider Canada for postsecondary studies. The opportunity to work while enrolled in postsecondary education provides international students with much-needed financial resources since scholarships for non-Canadian students are limited. Yet there is research evidence, albeit scattered, that not all international students have the financial means to fend for themselves and meet their financial obligations for the entire study program. Such students are at significant risk of food insecurity. This scoping review will focus on available research on food insecurity among international students studying in postsecondary educational institutions. This scoping review aims to synthesize existing evidence on the risk factors of food insecurity and identify the types of food insecurity interventions to address this issue.

Methods and analysis: This scoping review will be conducted according to the methodology recommended by Joanna Briggs Institute (JBI). We anticipate that the proposed scoping review will contribute to the existing body of knowledge on food insecurity among international students, identify gaps in knowledge on the topic, inform future research direction, and provide evidence-based information to strengthen policies and interventions that will inform how postsecondary institutions and organizations may collaborate to support vulnerable international students.

Ethics and dissemination: No ethical approval is required since this study is based on the analysis of published literature.

Keywords: Food insecurity; International student; Interventions; Post-secondary institutions

Strengths and Limitations

1. The present study will synthesize research evidence about the risk factors leading to food insecurity among international students.
2. This research will identify relevant interventions to address food insecurity among international students, which can be adapted and applied to a local setting.
3. This review only focuses on studies published in English, implying that relevant research published in other languages will be omitted.

BACKGROUND

Food insecurity, defined as the unreliable access to sufficient, culturally safe, and nutritious food at all times, is a pervasive global issue with serious health consequences [1–3]. Although Canada is a developed country, a growing number of people are at risk of food insecurity because they do not have reliable access to sufficient, culturally safe, and nutritious food at all times [4]. According to the Canadian Community Health Survey (2017-2018), 12.7% of Canadian households (4.4 million people, including 1.2 million children under the age of 18) have experienced some level of food insecurity in the previous 12 months [5]. This is concerning because household food insecurity denotes pervasive material deprivation associated with higher chronic health conditions [2].

The risk of experiencing food insecurity is higher among Indigenous people, immigrants, and students and has attracted a lot of research attention [6–8]. In particular, food insecurity among postsecondary students has been brought to the forefront as evidence continues to accrue from Canada and other developed countries [9–12]. A survey on food insecurity among postsecondary students in five Universities across Canada indicated that almost 2 in 5 students (39%) experienced some degree of food insecurity [13]. Indigenous and racialized students, off-campus student residents, and those primarily supported by government student financial assistance programs reported a high risk of experiencing food insecurity [13]. The situation is likely worse for international students since many live in precarious conditions with limited access to crucial rights or entitlements usually associated with permanent residence and citizenship [11,14].

International student mobility is an integral part of Canada's temporary migration stream. Canada is now the third most popular destination for international students [15]. According to the report on International Education strategy (2019-2024), international students contributed approximately \$21.6 billion (through tuition and living expenses, etc.) in 2018 and sustained about 170,000 jobs in 2016 [15]. Additionally, Canadian-trained international students enhance the pool of qualified employees needed to address the significant medium- and long-term labor shortages [15]. Yet several studies suggest that majority of them have limited financial support, high tuition, fewer funding opportunities, and limited social networks [9,16].

Studying in a university or college abroad can be pretty stressful and demanding. It requires resilience to adjust to a new learning environment, community, and lifestyle while dealing with the stress of balancing academic demands, work, and family commitments back home. These challenges might be further augmented by financial pressure to cover academic and non-academic expenses such as tuition and rent, as well as limited cooking skills or insufficient time to prepare meals, limited knowledge about the availability of culturally familiar food, and the necessity to make food choices without family support [17,18]. These issues have garnered extensive research attention in Canada [13,17] since they can affect international students' academic success, health, and vulnerability to food insecurity.

Food insecurity negatively impacts students' health and academic performance. Students experiencing food insecurity are more likely to cut down on food expenses to support other living

and education costs [13,19,20]. Several studies show that food insecurity is associated with lower GPA/grades [9,21]. Food insecure international students are also likely to experience dietary challenges, leading to weight gain, increased fatigue, abdominal discomfort, and other health consequences [22].

The gravity of these ramifications underscores the urgency to address international students' vulnerability to food insecurity. Food insecurity among international students was already a significant problem before the COVID-19 pandemic and will persist after this global pandemic. However, anecdotal suggests the COVID-19 health crisis has magnified the prevailing inequities that heighten international students' vulnerability to food insecurity. To address these issues, it is essential to synthesize insights from existing research about the risk factors of food insecurity among international students and identify effective food insecurity interventions. Yet, there are no studies that consolidate research findings on these issues to date. Such insights are necessary to inform initiatives to support international students vulnerable to food insecurity.

Although there are a few scoping reviews on food insecurity, the focus has broadly been on either immigrants or postsecondary school students [10,11,23]. Given their broad focus, these scoping reviews pay superficial attention to international students' unique challenges and experiences. There is a seminal scoping review that explores the experiences of international students; however, the primary focus is on the prevalence of food insecurity, dietary changes, and how food insecurity affects nutrition, academic achievements, and health outcomes [24]. Admittedly, insights from our scoping review are needed to understand the problem better and identify gaps in existing knowledge that warrant urgent attention. This is imperative because existing studies show that the precarious experiences of temporary migrants, like international students, could have cumulative long-term effects on their integration and wellbeing even after they transition to permanent residence [25].

AIMS/PURPOSE

This scoping review will focus on available research on food insecurity among international students studying postsecondary educational institutions. This scoping review aims to synthesize existing evidence on the risk factors of food insecurity to understand the problem and its urgency better and identify different types of food insecurity interventions that could be adapted to address the issue.

METHODS

This scoping review will follow the process recommended by Joanna Briggs Institute (JBI) [26]. The JBI methodology for scoping review clearly outlines the inclusion criteria for selecting relevant articles for a scoping review, the strategy for searching and identifying relevant literature, the database used for the literature search, and screening and extracting studies to address research objectives[26].

Inclusion criteria

There are five inclusion criteria for this scoping review: studies should 1) have international students as its target population; 2) focus on food insecurity, operationalized as experiencing hunger or issues with the quality or quantity of food consumed, reducing intake of food, seeking food assistance, disrupted eating patterns and challenges obtaining culturally appropriate foods; 3)

be written in English; 4) be conducted in popular destinations for international studies, including Canada, United Kingdom, Australia, New Zealand, and the United States and; 5) be a primary research study employing either a quantitative, qualitative or mixed methods research design, implying that literature reviews, letters to the editors and opinion pieces will be excluded. In addition to these criteria, we will also include studies that discuss interventions implemented to address food insecurity among international students.

Search Strategy

The scoping review will be based on a three-step search process [26]. Firstly, the research team will search MEDLINE and CINAHL to search for literature related to the topic [26]. Next, the research team will identify all the keywords related to the topic and draft a concept map (see Appendix 1). The second search will be based on the concept map, using all relevant databases. Thirdly, the research team will screen all references lists of articles obtained from previous searches and download all articles identified based on the above inclusion criteria [26].

Information sources

With the assistance of a librarian, we will search for relevant literature from eight databases ---- MEDLINE (via Ovid), CINAHL (EBSCO), Global Health (via Ovid), ERIC (via Ovid), CENTRAL (via Ovid); PubMed, PROSPERO, and ProQuest.

Study selection:

After an extensive search in these databases, all relevant articles and research papers identified will be imported into Mendeley, a free reference managing software[27]. All duplicate literature will be detected and deleted at this stage. Next, two reviewers will be responsible for screening articles. If the two reviewers have different ideas on one article, a third reviewer will help decide.

Data extraction and presentation:

After finalizing the articles selected for the scoping review, the research team will chart the results based on 1) author(s); 2) the publication year; 3) location of the research conduct; 4) purpose of the study; 5) study population; 6) methods; 7) intervention; 8) features of the intervention; 9) study results and outcomes; 10) key findings. Two reviewers will also be responsible for the data analysis process. The scoping review will include a table that summarizes the information shown in the data extraction part. The table will constantly be revised throughout the research process as reviewers deepen their understanding of the research topic [26]. After that, the research team will provide a summary of the results, and it will be based on the research purpose.

PATIENT AND PUBLIC INVOLVEMENT

The study is a scoping review, and hence there are no study participants or patients involved.

DISCUSSION

Canada is a significant destination for international students due to its reputation for quality education, cheap tuition, and a promise for a more straightforward pathway to permanent residency [28]. The allure of the prospects to apply for postgraduate work permits and eventually become permanent residents attracts many people to consider Canada for postsecondary studies [29]. Since the Canadian study permit allows students to work off-campus for up to 20 hours a week during school sessions and full-time during vacation months, international students provide cheap labor to support the economy [30].

To be granted a study permit, an applicant must demonstrate the ability to meet their financial obligation for tuition and sustenance for at least one year [31,32]. Therefore, there is a potential that students who succeed in their study permit application may not have all the monies they need to support the completion of their program [17]. Such students hope to raise the tuition and other monies needed for their upkeep through working on and off-campus [33].

The provisions for off-campus work for international students provide them with much-needed financial resources since there are limited scholarships for non-Canadian and permanent residents. The students who must work to support their studies are at risk of exploitation to work unlawful hours, poor working conditions, or minimum wage [34]. They also risk academic performance because of competing interests between pursuing education and supporting themselves. Instances of international students experiencing poverty, food insecurity, and homelessness are well documented [17,35].

International students may refrain from seeking help in a financial crisis due to the stigma associated with appearing needy and unfounded fear of being deported for not meeting their financial obligations. Anecdotal evidence alludes to the fact that many international students studying in Canadian postsecondary education may be living in poverty[35]. However, their plight may be invisible because universities are not obligated to maintain international students' social wellbeing statistics. Nevertheless, there is no denying that international students unable to meet their financial obligations are a vulnerable population due to the increased risk of poverty. Considering the symbiotic relationship between international students and the Canadian economy, institutions where they pursue their studies have a moral obligation to ensure the wellbeing of international students.

Conducting a scoping review on the food insecurity among international students, which is a mark of financial insecurity and poverty [11,36,37], and seeking to understand interventions to address it, will shed light on the scope of the problem and provide a piece of the much-needed information about how best to support international students in financial want. Such information may inform how postsecondary institutions and organizations that support international students may collaborate to support these students. Thus, findings from this scoping review will have significant implications for the broader scholarly community and postsecondary institutions, immigrant service providers/agencies, student associations, and local community organizations. A conversation on better matrices to measure international students' ability to fully meet their financial obligations for the duration of their course can also ensue.

LIMITATIONS

Not including research written in English may exclude certain relevant studies that may be insightful for the study.

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CONTRIBUTORS

JA conceptualized the idea that led to the development of the scoping review protocol, supported the search strategy development, and contributed to other sections of the protocol. MP drafted the background section and edited the protocol. GM wrote the discussion section, edited and proofread the protocol. YL drafted the methods section and proofread the protocol. DON edited and proofread the protocol.

CONFLICTS OF INTERESTS

There is no conflicts of interests.

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APPENDIX 1: CONCEPT MAP FOR THE SEARCHING STRATEGY

International Students	Food Insecurity	Post-secondary Education	Intervention
International student*	Food insecurity	Post-secondary education	Intervention
Foreign student*	Food security	Universit*	Food bank*
Overseas student*	Food access	College*	Food assistance
Student* abroad	Food availability	Polytechnic*	Food stamp*
Ethnic student*	Food stability	Campus*	Food pantry
	Food utili*ation	Higher education	Food shel*
	Hunger		Nutrition education
	Ethnic food		
	Food supply		
	Food accessibility		
	Cultural food		
	Food quality		
	Food quantity		

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Food Insecurity among Postsecondary International Students: A Scoping Review Protocol

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ABSTRACT

Introduction: International students make significant contributions to their host institution and country. Yet research shows that not all international students have the financial means to fend for themselves and meet their financial obligations for the entire study program. Such students are at significant risk of food insecurity. This scoping review will focus on existing studies on food insecurity among international students enrolled in postsecondary institutions. The objective of this review is to synthesize available information on the factors related to food insecurity among the population and identify the types of food insecurity interventions that have been implemented to address this issue.

Methods and analysis: The Joanna Briggs Institute (JBI) scoping review methodology will be used to guide this scoping review and we will search the following databases: MEDLINE (through Ovid), CINAHL (EBSCO), PubMed, ERIC (via Ovid), PROSPERO, and ProQuest. The titles, abstracts, and subsequently full texts of the selected papers will then be screened against the inclusion criteria. Data from articles included in the review will be extracted using a data charting form and will be summarised in a tabular form. Thematic analysis will be used to identify common themes that thread through the selected studies.

Ethics and dissemination: Because this project entail a review of available literature, ethical approval is not required. The findings will be presented at academic conferences and published in a peer-reviewed journal. To make the findings more accessible, they will also be distributed via digital communication platforms.

Strengths and limitations of this study

- The scoping review will map the existing food insecurity interventions across multiple contexts and provide vital insights that may be tailored to different contexts.
- Examining the breadth of literature on factors related to food insecurity among international students would increase the understanding of the pertinent issues in this area and the identification of research gaps that should be addressed in the future.
- By excluding studies that are not written in English, studies that may be relevant for consideration in the scoping may be omitted, leading to selection bias.
- The effectiveness of the food insecurity interventions will not be assessed in the scoping review.

INTRODUCTION

As part of a broader effort to compete for highly skilled immigrants and replace an ageing workforce, several advanced economies focus on attracting international students, especially those at the postsecondary level[1]. Between 2010 and 2017, the share of international students increased by two percentage points across the Organisation for Economic Co-operation and Development (OECD) member countries [2]. Many international students choose to study in English-speaking countries in the OECD, particularly Australia, Canada, the United Kingdom and the United States. These four (4) countries attract more than 40% of international students in the OECD countries[2].

International students contribute significantly to their host institution and country. In Australia, for instance, international students contributed about \$30.3 billion to the economy in 2017, an increase of 8.1% from the \$28.0 billion reported for the 2016-17 fiscal year[3]. International students in Canada also contributed around \$21.6 billion (via tuition and living expenditures, etc.) in 2018 and sustained nearly 170,000 jobs in 2016 [4]. Furthermore, they increase the pool of qualified employees needed to meet the large medium- and long-term labour shortages in their host country [4]. Yet many international students experience financial challenges due to costly tuition, fewer funding opportunities, and limited employment opportunities and social networks [5,6].

Studying at a university or college in another country can be a demanding and stressful experience, especially in the initial stages [7,8]. It requires resilience to adapt to a new learning environment, culture, and way of life while juggling academic demands, work, and family obligations back home. These challenges may be exacerbated by financial pressure to cover academic and non-academic expenses such as tuition and rent, exposure to prejudicial or discriminatory treatment, limited cooking skills or insufficient time to prepare meals, limited knowledge about the availability of culturally familiar food, and the need to make food choices without family support [6,9]. These issues have received extensive examination in the literature because of their potential effect on students' school adjustments, health, and food insecurity [10–12].

Food insecurity, defined broadly as the unreliable availability, utilization, stability, and access to sufficient, culturally safe, and nutritious food at all times, is a widespread global problem with considerable health effects [13–15]. As evidence from Canada and other popular immigrant-destination countries continues to accumulate [5,16–20], food insecurity among postsecondary students has been brought to the centre of policy and scholarly discussions. According to a survey on food insecurity among postsecondary students at five Canadian universities, about 39% of students experienced some level of food insecurity [21]. Another survey undertaken at a large mid-Atlantic publicly funded university in the United States discovered that 15% of the students were food insecure[18]. Food insecurity is more common among ethnic and minority students because they are more likely to experience structural barriers to getting foods that meet their cultural food needs [18,19,21].

Food insecurity has a severe impact on students' health and academic performance. Several studies have found that food insecurity is associated with poor academic performance [5,22]. Food insecure students tend to experience financial strain and thus are more likely to cut back on food expenses to support other living costs [21] and take on survival jobs to supplement their income. Students who must work out of necessity are at risk of being exploited to work illegal hours, in terrible working conditions, and often for minimum wage [23], which can harm their health and jeopardize their academic performance. Furthermore, Wright and colleagues' [19,20] work with students at the University of Nevada, Reno, suggests that inadequate availability, access, and

utilization of cultural foods, also known as cultural food insecurity, can negatively impact the well-being and identity of international students and students who self-identify as an ethnic minority. Cultural food insecurity reduces an individual's ability to follow their traditional foodways, which can increase the risk of cultural stress and subsequently lead to anxiety, depression and sentiments of ethnic isolation or identity erosion[19,24].

International students may be particularly vulnerable to the harmful effects of food insecurity because they often live in precarious conditions and have restricted access to rights and entitlements generally associated with permanent residence and citizenship [5,6]. As with other immigrant groups, many international students go through periods of melancholy because of their separation from family and their home country [20]. They also face a great deal of acculturative stress and cultural shocks, which are often associated with moving to a country with a different culture [8,20]. These stressors could have negative effects on their dietary choices, which can cause them to gain or lose weight, feel more fatigued, and have other physical health problems.

Given these consequences, it is urgent to address food security issues among international students. There is extensive research exploring the reasons for increased food insecurity among postsecondary students in general [5,11]. The results have informed initiatives like food banks, food pantries, and Emergency Food Assistance Programs, just to name a few, at various universities and colleges. Yet there are limited studies that synthesize insights from these studies and identify the different initiatives implemented to address food insecurity, especially for international students. Although there are a few scoping reviews on food insecurity among immigrants and students in postsecondary education [17,25,26], these reviews only pay cursory attention to international students' unique issues and experiences because of their broad focus. The proposed scoping review by Shi and colleagues is an exception. However, the primary focus of this review is on the dietary changes of postsecondary international students, their food insecurity status, and factors affecting their nutrition, academic achievement, and health outcomes [27].

Against this backdrop, a review of studies on the factors that contribute to food insecurity among postsecondary international students and the types of food insecurity interventions designed to assist their food needs in various contexts is warranted; hence, the focus of this scoping review. International students face a myriad of challenges that are particular to their situation. As such, food security initiatives and strategies designed for the broader postsecondary student population may not be suitable for them. Indeed, insights gained from this scoping review are required to better understand the unique challenges international students face and identify gaps in the existing literature for future investigations.

This scoping review will focus on studies conducted in Canada, Europe, Australia, New Zealand, and the United States since they are popular study places for international students. By reviewing studies conducted in multiple countries, we can acquire a deeper understanding of the issue and its urgency and gain valuable insights into various strategies that can be tailored to unique contexts and circumstances. This review will be guided by two research questions:

1. What factors have been studied about food insecurity among international students studying in postsecondary educational institutions in Canada, Europe, Australia, New Zealand, and the United States?
2. What types of interventions and strategies for addressing food insecurity among postsecondary international students have been documented?

METHODS AND ANALYSIS

The proposed scoping review will apply the Joanna Briggs Institute (JBI) scoping review methodology [28], which is based on prior work by Arksey and O'Malley [29] and Levac and colleagues [30]. Below are the steps for conducting a scoping review based on the JBI guidelines.

Inclusion criteria

To be selected in the review, studies must: 1) have postsecondary international students as their target population; 2) focus on food insecurity, operationalized as experiencing hunger or issues with the quality or quantity of food consumed, reducing intake of food, seeking food assistance, disrupted eating patterns and challenges obtaining culturally appropriate foods; 3) be written in English; 4) be performed in popular study places for international studies, including Canada, Europe, Australia, New Zealand, and the United States and; 5) be a primary research study employing either a quantitative, qualitative or mixed methods research design. In addition to these criteria, we will also include studies that discuss interventions implemented to address food insecurity among international students. Focusing on empirical studies, the research team will exclude reviews, letters to the editors and opinion pieces from the review.

Search Strategy

A limited search of MEDLINE and CINAHL was conducted to find articles for this review. A full search strategy was then constructed based on text words found from the titles and abstracts of the identified studies, as well as the index terms used to characterize the studies. To search for additional studies, the reference lists of all included studies will be screened. Appendix I details the search strategy for MEDLINE. This strategy will be tailored to each database included in the review.

Information sources

With the help of a librarian, we will search for relevant literature from the following electronic databases: MEDLINE (via Ovid), CINAHL (EBSCO), PubMed, ERIC (via Ovid), PROSPERO, and ProQuest.

Study selection

Following a thorough search of the specified databases, the retrieved results will be compiled and uploaded to Rayyan, a web-tool for screening and selecting studies for knowledge synthesis [31]. All duplicate studies will then be detected and deleted. We will follow a two-step screening process. First, the titles and abstracts of the selected papers will be screened independently by two reviewers to ensure they meet the inclusion criteria. Next, the full texts of the papers that make it through the first screening stage will be retrieved and carefully vetted by two reviewers against the inclusion criteria. Any disagreements between the reviewers will be addressed through discussion or with the assistance of a third reviewer who will serve as a tie breaker. To indicate the search and study selection process, the research team will use the Preferred Reporting Items for Systematic Reviews and Meta-analyses for scoping reviews (PRISMA-ScR) flow diagram[32].

Data extraction

After the research studies that will be included in the scoping review have been finalized, two reviewers will independently extract data from the studies using a data charting form developed by the research team. Specific details that will be extracted are: 1) author(s); 2) publication year; 3) country where the research was conducted; 4) aims/objectives of the study; 5) study design; 6) intervention; 7) characteristics of the intervention; 8) key findings; 9) Gaps identified. The data charting form will be revised during the data extraction process as reviewers deepen their understanding of the research topic.

Data presentation

The scoping review will include a table summarizing the information collected through the data extraction process. The tabulated results will be accompanied by a narrative summary derived through thematic analysis. The narrative summary will explain how the findings relate to the objectives and questions of the scoping review

DISCUSSION

Instances of international students experiencing financial challenges and food insecurity are well documented [5,33]. However, their plight may go unnoticed because universities are not required to keep track of international students' well-being statistics. While several strategies have been implemented to address food insecurity among college students, anecdotal evidence suggests that international students may avoid using these services when needed, partly due to the stigma associated with appearing needy and the fear of being deported for struggling to meet their financial obligations. This implies that strategies for promoting food security among international students might differ from those for the general college student population.

To stimulate further discussions about proactive steps to address the issue, synthesizing studies on the factors associated with food insecurity among international students and identifying the various support strategies across multiple countries are required. Yet, little progress has been made in this regard. This scoping review will consolidate insights from available studies, identify gaps in existing literature, and provide some much-needed information on how to best support vulnerable international students. Relevant food security interventions will be mapped across multiple contexts, which will yield critical insights that can be customized to different contexts.

There are, however, limitations to this review. Although we map existing food insecurity interventions across multiple contexts, we do not assess their effectiveness in this scoping review. The review also excludes studies that are not written in English. This could lead to selection bias since we might be leaving out relevant studies on this topic. Without those studies, our descriptive account might not be as comprehensive as it could be.

These limitations notwithstanding, the findings of this scoping review could have far-reaching implications for the scholarly community and postsecondary institutions, as well as immigrant service providers/agencies, student associations, and local community organizations. Educational institutions, communities, and nations that successfully recruit international students have a moral obligation to maintain their well-being because they contribute significantly to the economy and society. Thus, insights from this review may influence how postsecondary institutions and organizations that assist students collaborate to help vulnerable international

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students. A discussion about better matrices for measuring international students' ability to fully meet their financial obligations for the duration of their study may also ensue.

ETHICS AND DISSEMINATION

No ethical approval is required since this study is based on the analysis of published literature. Findings will be presented at conferences and published in a peer-reviewed journal. Digital platforms will be used to determinate the findings.

For peer review only

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AUTHORS’ CONTRIBUTIONS

JA conceptualized the idea that led to the development of the scoping review protocol, supported the search strategy development, and contributed to other sections of the protocol. MP drafted the background section and edited the protocol. GM wrote the discussion section and edited and proofread the protocol. YL drafted part of the method section and proofread the protocol. DON edited and proofread the protocol.

FUNDING STATEMENT

This research was supported by the Insight Development Grant program of the Social Science and Humanities Research Council.

COMPETING INTERESTS

There are no competing interests.

PATIENT AND PUBLIC INVOLVEMENT

The study is a scoping review, and hence there are no study participants or patients involved.

WORD COUNT: 3,586 words.

Searching Strategy of MEDLINE (Ovid)

The following searches were performed in May, 2022.

Keywords	Steps	Search	Results
International Students	1	exp International Educational Exchange/ or exp Students/	157249
	2	international student*.mp.	1008
	3	foreign student*.mp.	309
	4	overseas student*.mp.	87
	5	student* abroad.mp.	41
	6	ethnic student*.mp.	35
	7	sojourner*.mp.	169
	8	transnational migrant*.mp.	32
	9	Migrant student*.mp.	38
	10	Student mobility.mp.	64
	11	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	158122
Food insecurity	12	exp food insecurity/ or exp access to healthy foods/	935
	13	food insecurity.mp.	6193
	14	food security.mp.	10431
	15	food access.mp.	1242
	16	food availability.mp.	4438
	17	food stability.mp.	42
	18	Food utili*ation.mp.	452
	19	Hunger.mp.	13203
	20	Ethnic food.mp.	61
	21	food supply.mp.	18819
	22	food accessibility.mp.	139
	23	cultural food.mp.	94
	24	food quality.mp.	7103
	25	food quantity.mp.	249
	26	food poverty.mp.	90
	27	food scarcity.mp.	318
	28	food loss.mp.	186
	29	loss of food.mp.	438
	30	access to food.mp.	2431
	31	food instability.mp.	5
	32	food insufficiency.mp.	176
	33	food desert.mp.	165
	34	food swamp.mp.	20
	35	food apartheid.mp.	0
	36	food hardship.mp.	18
	37	food sovereignty.mp.	118

38	food capacity.mp.	5
39	"food use".mp.	418
40	cuisine.mp.	796
41	foodways.mp.	83
42	foodscape.mp.	54
43	regional food.mp.	161
44	traditional food.mp.	1090
45	national dish.mp.	4
46	food shed.mp.	2
47	country food.mp.	80
48	culturally appropriate food*.mp.	39
49	culturally acceptable food*.mp.	19
50	culturally accepted food*.mp.	4
51	culturally preferred food*.mp.	3
52	culturally satisfying food*.mp.	0
53	preference of food*.mp.	260
54	food system*.mp.	3582
55	food practice*.mp.	384
56	food procurement*.mp.	166
57	food preparation*.mp.	2294
58	food knowledge*.mp.	175
59	traditional food*.mp.	1645
60	indigenous food*.mp.	163
61	native food*.mp.	111
62	food culture*.mp.	378
63	culinary heritage*.mp.	9
64	food choice*.mp.	5766
65	dietary choice*.mp.	1053
66	dietary acculturation.mp.	108
67	traditional diet*.mp.	1099
68	traditional eating.mp.	63
69	food allocation*.mp.	68
70	food adequacy.mp.	10
71	adequate food*.mp.	550
72	nutritional adequacy.mp.	786
73	emergency food*.mp.	203
74	Food stress.mp.	126
75	Food hardship*.mp.	21
76	12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or	70424

		52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75	
Post-Secondary Education	77	Post-secondary education.mp.	502
	78	Universit*.mp.	461892
	79	College*.mp.	136524
	80	Polytechnic*.mp.	610
	81	Campus*.mp.	12199
	82	Higher education*.mp.	20262
	83	tertiary education*.mp.	1534
	84	third-level.mp.	1873
	85	third-stage.mp.	5655
	86	graduate.mp.	70932
	87	undergraduate.mp.	60815
	88	trade school*.mp.	99
	89	technological universit*.mp.	74
	90	vocational school*.mp.	644
	91	technical school*.mp.	354
	92	vocational college*.mp.	66
	93	77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92	685285
Intervention	94	intervention*.mp.	1246971
	95	Food bank*.mp.	301
	96	Food assistance.mp.	2029
	97	Food stamp*.mp.	390
	98	food pantry.mp.	175
	99	food shel*.mp.	273
	100	nutrition education*.mp.	5499
	101	(Special Supplemental Nutrition Program for Women, Infants, and Children).mp.	757
	102	Supplemental Nutrition Assistance Program.mp.	652
	103	Electronic Benefits Transfer.mp.	17
	104	The Emergency Food Assistance Program.mp.	4
	105	soup kitchen.mp.	48
	106	mobile pantry.mp.	2
	107	mobile food*.mp.	92
	108	food deliver*.mp.	896
	109	94 or 95 or 96 or 97 or 98 or 99 or 100 or 101 or 102 or 103 or 104 or 105 or 106 or 107 or 108	1253717
Final	110	11 and 76 and 93 and 109	158

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	
Limitations	20	Discuss the limitations of the scoping review process.	
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. 2018;169:467–473. doi: 10.7326/M18-0850.

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Food Insecurity among Postsecondary International Students: A Scoping Review Protocol

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Food Insecurity among Postsecondary International Students: A Scoping Review Protocol

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ABSTRACT

Introduction: International students make significant contributions to their host institutions and countries. Yet research shows that not all international students have the financial means to fend for themselves and meet their financial obligations for the entire study program. Such students are at significant risk of food insecurity. The objective of this scoping review is to synthesize available information on the factors related to food insecurity among international students studying at postsecondary educational institutions and identify the types of food insecurity interventions that have been implemented to address this issue.

Methods and analysis: The Joanna Briggs Institute (JBI) scoping review methodology will be used to guide this scoping review, and we will search the following databases: MEDLINE (through Ovid), CINAHL (EBSCO), PubMed, ERIC (via Ovid), PROSPERO, and ProQuest. The titles, abstracts, and subsequently full texts of the selected papers will then be screened against the inclusion criteria. Data from articles included in the review will be extracted using a data charting form and will be summarized in a tabular form. Thematic analysis will be used to identify common themes that thread through the selected studies and will be guided by the steps developed by Terry and colleagues.

Ethics and dissemination: Since this project entails a review of available literature, ethical approval is not required. The findings will be presented at academic conferences and published in a peer-reviewed journal. To make the findings more accessible, they will also be distributed via digital communication platforms.

Strengths and limitations of this study

- The scoping review will map the existing food insecurity interventions for international students at postsecondary institutions across multiple contexts and provide vital insights that may be tailored to different contexts.
- Examining the breadth of literature on factors related to food insecurity among international students would improve the understanding of the pertinent issues in this area and allow for the identification of research gaps that should be addressed in the future.
- Relevant studies that are not written in English will be omitted, leading to selection bias.
- The effectiveness of the food insecurity interventions will not be assessed in the scoping review.

INTRODUCTION

As part of a broader effort to compete for highly skilled immigrants and replace an ageing workforce, several advanced economies are focusing on attracting international students, especially those at the postsecondary level.[1] Between 2010 and 2017, the share of international students increased by two percentage points across the Organisation for Economic Co-operation and Development (OECD) member countries.[2] Many international students choose to study in English-speaking countries in the OECD, particularly Australia, Canada, the United Kingdom, and the United States. These four countries attract more than 40% of the international students studying in OECD countries.[2]

International students contribute significantly to their host institutions and countries. In Australia, for instance, international students contributed about \$30.3 billion to the economy in 2017.[3] International students in Canada also contributed around \$21.6 billion (via tuition, living expenditures, etc.) in 2018 and sustained nearly 170,000 jobs in 2016.[4] Furthermore, they increase the pool of qualified employees needed to meet the large medium- and long-term labour shortages in their host countries.[4] Yet many international students experience financial challenges due to costly tuition, fewer funding opportunities, and limited employment opportunities and social networks.[5, 6]

Studying at a university or college in another country can be a demanding and stressful experience, especially in the initial stages.[7, 8] It requires resilience to adapt to a new learning environment, culture, and way of life while juggling academic demands, work, and family obligations back home. These challenges may be exacerbated by financial pressure to cover academic and non-academic expenses such as tuition and rent, by exposure to prejudicial or discriminatory treatment, by limited cooking skills or insufficient time to prepare meals, by limited knowledge about the availability of culturally familiar food, and by the need to make food choices without family support.[6, 9] These issues have received extensive examination in the literature because of their potential effect on students' school adjustments, health, and food insecurity.[10-12]

Food insecurity, defined broadly as the unreliable availability, use, stability, and access to sufficient, culturally safe, and nutritious food, is a widespread global problem with considerable health effects.[13-15] As evidence from Canada and other popular immigrant-destination countries continues to accumulate,[5, 16-20] food insecurity among postsecondary students has been brought to the centre of policy and scholarly discussions. According to a survey on food insecurity among postsecondary students at five Canadian universities, about 39% of students experienced some level of food insecurity.[21] A systematic review, involving studies about food insecurity on postsecondary campuses in the United States and other countries, suggests that the rate of food insecurity ranges between 12% and 84%.[22] In another review that focused exclusively on college students in the United States, the prevalence rate ranged from 10% to 75%.[23] Food insecurity is more common among ethnic minority students because they are more likely to experience structural barriers to getting foods that meet their cultural food needs.[18, 19, 21]

Food insecurity severely affects students' health and academic performance. Several studies have found that food insecurity is associated with poor academic performance.[5, 24] Food insecure students tend to experience financial strain and thus are more likely to cut back on food expenses to support other living costs[21] and to take on survival jobs to supplement their income. Students who must work out of necessity are at risk of being exploited to work illegal hours, in terrible working conditions, and often for minimum wage,[25] which can harm their health and jeopardize their academic performance. Furthermore, Wright and colleagues' work[19, 20] with

students at the University of Nevada, Reno, suggests that inadequate availability, access, and use of cultural foods, also known as cultural food insecurity, can negatively impact the well-being and identities of international students and students who self-identify as ethnic minorities. Cultural food insecurity reduces an individual's ability to follow their traditional foodways, which can increase the risk of cultural stress and subsequently lead to anxiety, depression, ethnic isolation, and identity erosion.[19, 26]

International students may be particularly vulnerable to the harmful effects of food insecurity because they often live in precarious conditions and have restricted access to rights and entitlements generally associated with permanent residence and citizenship.[5, 6] For instance, international students in Canada have limited working hours as part of the conditions of their study permit. They can work no more than 20 hours per week off campus during regular school semesters.[27] Given that many international students experience financial challenges, having limited working hours increases their vulnerability to poverty and food insecurity. In the United States, international students are not eligible to receive public benefits from federal programs like the Supplemental Nutrition Assistance Program, which is primarily restricted to citizens and certain non-citizens who are lawfully present in the country.[28]

This underscores the urgency to address food security issues among international students. There is extensive research exploring the reasons for increased food insecurity among postsecondary students in general.[5, 11] The results have informed initiatives like campus food banks, food pantries, and other emergency food assistance programs at various universities and colleges. Yet there are limited studies that synthesize insights from these studies and identify the different initiatives implemented to address food insecurity, especially for international students. Although there are a few scoping reviews on food insecurity among immigrants and students in postsecondary education,[17, 23, 29] these reviews only pay cursory attention to international students' unique issues and experiences because of their broad focus. The proposed scoping review by Shi and colleagues is an exception. However, the primary focus of this review is on postsecondary international students' dietary changes, their food insecurity status, and factors affecting their nutrition, academic achievement, and health outcomes.[30]

Against this backdrop, a review of studies on the factors that contribute to food insecurity among postsecondary international students and the types of food insecurity interventions designed to assist their food needs in various contexts is warranted, hence the focus of this scoping review. International students face a myriad of challenges that are unique to their situation. As such, food security initiatives and strategies designed for the broader postsecondary student population may not be suitable for them. Indeed, insights gained from this scoping review are required to better understand the unique challenges international students face and identify gaps in the existing literature for future investigations.

This scoping review will focus on studies conducted in Canada, Europe, Australia, New Zealand, and the United States since they are popular study places for international students. By reviewing studies conducted in multiple countries, we can acquire a deeper understanding of the issue and its urgency and gain valuable insights into various strategies that can be tailored to unique contexts and circumstances. This review will be guided by two research questions:

1. What factors have been studied about food insecurity among international students studying at postsecondary educational institutions in Canada, Europe, Australia, New Zealand, and the United States?
2. What types of interventions and strategies for addressing food insecurity among postsecondary international students have been documented?

METHODS AND ANALYSIS

The proposed scoping review will apply the Joanna Briggs Institute (JBI) scoping review methodology,[31] which is based on prior work by Arksey and O'Malley[32] and Levac and colleagues.[33] Below are the steps for conducting a scoping review based on the JBI guidelines.

Inclusion criteria

To be selected in the review, studies must 1) have postsecondary international students as their target population; 2) focus on food insecurity, operationalized as experiencing hunger or issues with the quality or quantity of food consumed, reducing food intake, seeking food assistance, experiencing disrupted eating patterns, and having challenges obtaining culturally appropriate foods; 3) be written in English; 4) be performed in popular places for international students to study, including Canada, Europe, Australia, New Zealand, and the United States; and 5) be a primary research study employing a quantitative, qualitative, or mixed methods research design. In addition to these criteria, we will also include studies that discuss interventions implemented to address food insecurity among international students. The research team will exclude reviews, letters to the editors, and opinion pieces from the review.

Search Strategy

A limited search of MEDLINE and CINAHL was conducted to find articles on the topic that were used to help construct the full search strategy. A full search strategy was then constructed based on words found from the titles and abstracts of the identified studies, as well as the index terms used to characterize the studies. Appendix I details the search strategy for MEDLINE. This strategy will be tailored to each database included in the review. To search for additional studies, the reference lists of all included studies will be screened.

Information sources

With the help of a librarian, we will search for relevant literature from the following electronic databases: MEDLINE (via Ovid), CINAHL (EBSCO), PubMed, ERIC (via Ovid), PROSPERO, and ProQuest.

Study selection

Following a thorough search of the specified databases, the retrieved results will be compiled and uploaded to Rayyan, a web-tool for screening and selecting studies for knowledge synthesis.[34] All duplicate studies will then be detected and deleted. We will follow a two-step screening process. First, the titles and abstracts of the selected papers will be screened independently by two reviewers to ensure they meet the inclusion criteria. Next, the full texts of the papers that make it through the first screening stage will be retrieved and carefully vetted by two reviewers against the inclusion criteria. Any disagreements between the reviewers will be addressed through discussion or with the assistance of a third reviewer who will serve as a tie breaker. The search results and study screening and inclusion procedure will be displayed in a Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for Scoping

Reviews (PRISMA-ScR) flow diagram. The flow diagram will showcase how many records were identified, screened against the inclusion criteria, and included in the review, along with a rationale for exclusion at each stage.[35]

Data extraction

After the research studies that will be included in the scoping review have been finalized, two reviewers will independently extract data from the studies using a data charting form developed by the research team. The following details will be extracted: 1) author(s); 2) publication year; 3) country where the research was conducted; 4) aims/objectives of the study; 5) study design; 6) intervention; 7) characteristics of the intervention; 8) key findings; and 9) gaps identified. The data charting form will be revised during the data extraction process as reviewers deepen their understanding of the research topic.

Data analysis and presentation

The scoping review will include a table summarizing the information collected through the data extraction process. The tabulated results will be accompanied by a narrative summary derived through thematic analysis. Thematic analysis will be performed manually on the extracted data using the steps identified by Terry, Hayfield, Clarke, and Braun.[36] These include the following:

- a) *Familiarization of the data*: Once the data extraction has been completed, two researchers will independently read the compilation to gain insight into the data and identify patterns emerging from the causal observation of the data.
- b) *Coding*: In this step, the researchers will make labels using certain segments of the data that are relevant to the research questions. The coding process will be iterative and flexible, allowing for revisions as the analysis progresses.
- c) *Theme development*: In this step, the researchers will separately identify the central organizing content that is shared across a range of codes. They will then independently combine, cluster, or collapse the codes they developed into themes and refine them collaboratively.
- d) *Reviewing and defining of themes*: This is a quality control process in which the researchers will assess the themes to ensure they correspond with the coded data and are relevant to answer the research question.
- e) *Defining and naming the themes*: This step entails telling a story that is based on the data, allowing the research team to interpret the data in a way that is understandable.
- f) *Producing the report*: The researchers will compile the findings of the study using the developed themes.

PATIENT AND PUBLIC INVOLVEMENT

The study is a scoping review, and hence there are no study participants or patients involved.

DISCUSSION

Instances of international students experiencing financial challenges and food insecurity are well documented.[5, 37] However, their plight may go unnoticed because universities are not required to keep track of international students' well-being statistics. While several strategies have been implemented to address food insecurity among college students, anecdotal evidence suggests

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that international students may avoid using these services when needed, partly due to the stigma associated with appearing needy and the fear of being deported for struggling to meet their financial obligations. This implies that strategies for promoting food security among international students might differ from those for the general college student population.

To stimulate further discussions about proactive steps to address the issue, synthesizing studies on the factors associated with food insecurity among international students and identifying the various support strategies across multiple countries are required. Yet, little progress has been made in this regard. This scoping review will consolidate insights from available studies, identify gaps in existing literature, and provide some much-needed information on how to best support vulnerable international students. Relevant food insecurity interventions will be mapped across multiple contexts, which will yield critical insights that can be customized to different contexts.

There are, however, limitations to this review. Although we will map existing food insecurity interventions across multiple contexts, we will not assess their effectiveness in this scoping review. The review also excludes studies that are not written in English. This could lead to selection bias since we might be leaving out relevant studies on this topic. Without those studies, our descriptive account might not be as comprehensive as it could be.

These limitations notwithstanding, the findings of this scoping review could have far-reaching implications for the scholarly community and postsecondary institutions, as well as immigrant service providers and agencies, student associations, and local community organizations. Educational institutions, communities, and nations that successfully recruit international students have a moral obligation to maintain their well-being because they contribute significantly to the economy and society. Thus, insights from this review may influence how postsecondary institutions and organizations that assist students collaborate to help vulnerable international students. A discussion about better matrices for measuring international students' abilities to fully meet their financial obligations for the duration of their studies may also ensue.

ETHICS AND DISSEMINATION

No ethical approval is required since this study is based on the analysis of published literature. Findings will be presented at conferences and published in a peer-reviewed journal. Digital platforms will be used to determinate the findings.

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AUTHORS' CONTRIBUTIONS

JA conceptualized the idea that led to the development of the scoping review protocol, supported the search strategy development, and contributed to other sections of the protocol. MP drafted the background section and edited the protocol. GM wrote the discussion section and edited and proofread the protocol. YL drafted part of the method section and proofread the protocol. DON edited and proofread the protocol.

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COMPETING INTERESTS

There are no competing interests.

WORD COUNT: 3,962 words.

Searching Strategy of MEDLINE (Ovid)

The following searches were performed in May, 2022.

Keywords	Steps	Search	Results
International Students	1	exp International Educational Exchange/ or exp Students/	157249
	2	international student*.mp.	1008
	3	foreign student*.mp.	309
	4	overseas student*.mp.	87
	5	student* abroad.mp.	41
	6	ethnic student*.mp.	35
	7	sojourner*.mp.	169
	8	transnational migrant*.mp.	32
	9	Migrant student*.mp.	38
	10	Student mobility.mp.	64
	11	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	158122
Food insecurity	12	exp food insecurity/ or exp access to healthy foods/	935
	13	food insecurity.mp.	6193
	14	food security.mp.	10431
	15	food access.mp.	1242
	16	food availability.mp.	4438
	17	food stability.mp.	42
	18	Food utili*ation.mp.	452
	19	Hunger.mp.	13203
	20	Ethnic food.mp.	61
	21	food supply.mp.	18819
	22	food accessibility.mp.	139
	23	cultural food.mp.	94
	24	food quality.mp.	7103
	25	food quantity.mp.	249
	26	food poverty.mp.	90
	27	food scarcity.mp.	318
	28	food loss.mp.	186
	29	loss of food.mp.	438
	30	access to food.mp.	2431
	31	food instability.mp.	5
	32	food insufficiency.mp.	176
	33	food desert.mp.	165
	34	food swamp.mp.	20
	35	food apartheid.mp.	0
	36	food hardship.mp.	18
	37	food sovereignty.mp.	118

38	food capacity.mp.	5
39	"food use".mp.	418
40	cuisine.mp.	796
41	foodways.mp.	83
42	foodscape.mp.	54
43	regional food.mp.	161
44	traditional food.mp.	1090
45	national dish.mp.	4
46	food shed.mp.	2
47	country food.mp.	80
48	culturally appropriate food*.mp.	39
49	culturally acceptable food*.mp.	19
50	culturally accepted food*.mp.	4
51	culturally preferred food*.mp.	3
52	culturally satisfying food*.mp.	0
53	preference of food*.mp.	260
54	food system*.mp.	3582
55	food practice*.mp.	384
56	food procurement*.mp.	166
57	food preparation*.mp.	2294
58	food knowledge*.mp.	175
59	traditional food*.mp.	1645
60	indigenous food*.mp.	163
61	native food*.mp.	111
62	food culture*.mp.	378
63	culinary heritage*.mp.	9
64	food choice*.mp.	5766
65	dietary choice*.mp.	1053
66	dietary acculturation.mp.	108
67	traditional diet*.mp.	1099
68	traditional eating.mp.	63
69	food allocation*.mp.	68
70	food adequacy.mp.	10
71	adequate food*.mp.	550
72	nutritional adequacy.mp.	786
73	emergency food*.mp.	203
74	Food stress.mp.	126
75	Food hardship*.mp.	21
76	12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or	70424

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Post-Secondary Education	77	Post-secondary education.mp.	502
	78	Universit*.mp.	461892
	79	College*.mp.	136524
	80	Polytechnic*.mp.	610
	81	Campus*.mp.	12199
	82	Higher education*.mp.	20262
	83	tertiary education*.mp.	1534
	84	third-level.mp.	1873
	85	third-stage.mp.	5655
	86	graduate.mp.	70932
	87	undergraduate.mp.	60815
	88	trade school*.mp.	99
	89	technological universit*.mp.	74
	90	vocational school*.mp.	644
	91	technical school*.mp.	354
	92	vocational college*.mp.	66
	93	77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92	685285
Intervention	94	intervention*.mp.	1246971
	95	Food bank*.mp.	301
	96	Food assistance.mp.	2029
	97	Food stamp*.mp.	390
	98	food pantry.mp.	175
	99	food shel*.mp.	273
	100	nutrition education*.mp.	5499
	101	(Special Supplemental Nutrition Program for Women, Infants, and Children).mp.	757
	102	Supplemental Nutrition Assistance Program.mp.	652
	103	Electronic Benefits Transfer.mp.	17
	104	The Emergency Food Assistance Program.mp.	4
	105	soup kitchen.mp.	48
	106	mobile pantry.mp.	2
	107	mobile food*.mp.	92
	108	food deliver*.mp.	896
	109	94 or 95 or 96 or 97 or 98 or 99 or 100 or 101 or 102 or 103 or 104 or 105 or 106 or 107 or 108	1253717
Final	110	11 and 76 and 93 and 109	158

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	
Limitations	20	Discuss the limitations of the scoping review process.	
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. 2018;169:467–473. doi: 10.7326/M18-0850.